REMARKS

This Amendment is in response to the Office Action mailed November 18, 2002, which sets a three-month period for response. Reconsideration and withdrawal of the rejections of this application are respectfully requested in view of this amendment and remarks herewith.

Amended claims 1-3, 5, 12 and 13, new claims 21-25 and claim 4 are pending in this application.

Applicants disagree with the rejections made in the November 18, 2002 Office Action, however, in the interest of expediting prosecution of this patent application, claims 1-3, 5, 12 and 13 are amended and new claims 21-25 are added.

Support for the amended recitation in claims 1, 2, 3, 5, 12 and 13 and new claims 21-25 can be found in the originally filed specification. Specifically, amendment to claim 1 can be found on page 17, lines 11-14, on page 18, line 13 and throughout the application. Applicants reserve the right to pursue canceled subject matter in a continuation application.

No new matter is added.

It is submitted that these claims, as originally presented, are patentably distinct over the references cited by the Examiner, and that these claims were in full compliance with the requirements of 35 U.S.C. §112. Changes to these claims and the addition of the new claims, as presented herein, are not made for the purpose of patentability within the meaning of 35 U.S.C. §§101, 102, 103 or 112. Rather, these changes and additions are made simply for clarification and to round out the scope of protection to which Applicants are entitled.

Applicants re-affirm their election of Group II invention directed to claims 1-5, 12 and 13 for further prosecution of this application. Claims 6-11 and 14-20 are withdrawn from consideration pursuant to 37 C.F.R. § 1.142(b), as being drawn to nonelected subject matter.

Claim 1 is rejected under 35 U.S.C. § 102(b) as said to be anticipated by Wallace et al., U.S. Patent No. 6,020,243 ("Wallace"). (Office Action, at 2).

Applicants submit that independent claim 1 as amended is patentable over Wallace. Applicants therefore respectfully traverse the 102(b) rejection.

The present invention claims and discloses a gate insulating film provided on a semiconductor substrate which includes an insulating film containing metal, silicon, oxygen and either fluorine or fluorine and nitrogen. The advantage of the present invention is that a dangling bond on the interface of the silicon substrate can be terminated by doping fluorine or fluorine and nitrogen into the metal silicate film, so that a good interfacial characteristic can be obtained. (See Present Invention, Page 17, lines 11-14; and page 18, line 13).

For example, claim 1 recites,

"A semiconductor device comprising:

a semiconductor substrate; and

a gate insulating film, provided on the semiconductor substrate, at least part of which includes an insulating film containing metal, silicon and oxygen;

wherein **fluorine or fluorine and nitrogen are contained in said insulating film** containing metal, silicon and oxygen." (Emphasis added).

Wallace relates to s a semiconductor structure provided with a metal silicon-oxynitride gate dielectric layer having a gate insulating film containing metal, silicon, oxygen and nitrogen. Claim 1 and the present invention is patently distinct from Wallace since claim 1 and the present invention claim and provide an insulating film on a semiconductor substrate contains a structure of:

(1) metal + silicon + oxygen + fluorine, or

(2) metal + silicon + oxygen + fluorine + nitrogen.

"For a prior art reference to anticipate in terms of 35 U.S.C. 102(b), every element of the claimed invention must be identically shown in a single reference." Scripps Clinic & Research Foundation v. Genetech, Inc., 18 U.S.P.Q.2d 1001 (Fed. Cir. 1991). Since Wallace does not disclose or suggest every element of the presently claimed invention, the 35 U.S.C. 102(b) rejection based on Wallace cannot stand.

That is, Wallace does not claim and disclose a gate insulating film at least part of which includes an insulating film containing metal, silicon and oxygen, wherein fluorine or fluorine and nitrogen are contained in said insulating film containing metal, silicon and oxygen. Therefore, Applicants submit that amended independent claim 1 is patentable over Wallace.

New claim 21 is dependent from independent claim 1, and due to such dependency, is also distinguishable from Wallace.

Applicants respectfully request that the rejection of claim 1 under 35 U.S.C. 102(b) be withdrawn.

Claims 2 and 5 are rejected under 35 U.S.C. § 102(e) as said to be anticipated by Gardner et al., U.S. Patent No. 6,057,584 ("Gardner"), or, in the alternative, under 35 U.S.C. §103(a) as said to be obvious over Gardner in view of Wallace. (Office Action, at 3 to 5).

Applicants submit that independent claims 2 and 5 as amended are patentable over Gardner, or, in the alternative, the proposed combination of Gardner and Wallace. Applicants therefore respectfully traverse the 102(e) and/or the 103(a) rejection.

As explained above, the present invention claims and discloses a gate insulating film provided on a semiconductor substrate which includes an insulating film containing metal, silicon, oxygen and either fluorine or fluorine and nitrogen.

Wallace relates to a semiconductor device structure provided with a metal silicon-oxynitride gate dielectric layer having a gate insulating film containing metal, silicon and oxygen.

Gardner relates to a semiconductor device having a tri-layer dielectric for insulation of a gate electrode having a nitrogen-containing layer formed on a substrate. Gardner, however, does not disclose having a fluorine-containing layer or fluorine and nitrogen-containing layer formed on the substrate.

Since neither Garner nor Wallace disclose a gate insulating film at least part of which includes an insulating film containing metal, silicon and oxygen, wherein fluorine or fluorine and nitrogen are contained in said insulating film containing metal, silicon and oxygen, the 35 U.S.C. 102(e) rejection based on Gardner or the 103(a) rejection based on the proposed combination of Gardner and Wallace cannot stand.

In an obviousness rejection, the standard established in *In re Fritch*, 23 U.S.P.Q.2d 1780, 1783-84 (Fed. Cir. 1992), must be followed. *Fritch* in pertinent part states (with emphasis added):

> Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. Under Section 103, teachings of references can be combined only if there is some suggestion or incentive to do so . . . . **The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.**

Even though a reference can be modified in a way that the Examiner suggests, this does not mean that the reference renders the instant invention obvious unless the motivation to do the modification is in the reference's teaching. It is respectfully submitted that no such

teaching exists in the references cited by the current Office Action either alone or in any combination. There is nothing in the references' teachings suggesting the modification or the desirability of the modification. There is no evidence in the Office Action showing why the skilled artisan would have combined the cited references and then would have arrived at the present invention.

There must be some teaching, suggestion, or incentive in the references (and not Applicants' disclosure) that supports the combination of the references. *In re Fine*, 5 U.S.P.Q. 2d 1596, 1599-1600 (Fed. Cir. 1988). No such teaching, suggestion or incentive is in the cited documents.

According to the Board of Patent Appeals and Interferences in the case of *Ex parte Obukowicz*, 27 U.S.P.Q.2d 1063, 1065 (B.P.A.I. 1992) (with emphasis added):

> In proceedings before the Patent and Trademark Office, the Examiner bear the burden of establishing a *prima facie* case of obviousness based upon the prior art. *In re Piasecki*, 745 F.2d 1468, 1471-72, 223 U.S.P.Q. 785, 787-88 (Fed. Cir. 1984). **The Examiner can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references**. *In re Fine*, 837 F.2d 1071, 1074, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). **Indeed, the teachings of references can be combined only if there is some suggestion or incentive to do so**. *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 723 F.2d 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984).

The picking and choosing from both of the cited references to allege that the instant invention is obvious simply fails in light of the case law under Section 103. The Examiner is respectfully invited to cite references for the desirability of modification and the teaching, suggestion or incentive for combination and for modification of the reference teachings

or provide an affidavit, as called for by 37 C.F.R. §1.106(b) and M.P.E.P. §706.02(a). Otherwise, it is respectfully submitted that the Section 103 rejection must be withdrawn.

Accordingly, none of cited references, alone, or in any combination, render Applicants' invention *prima facie* obvious. Moreover, none of the references teach or suggest the surprising properties of the presently claimed invention, as shown in the application, which properties, Applicants submit are additionally demonstrative of the patentability of the instant invention.

Consequently, the present invention is not obvious in view of Wallace and Gardner, and neither Wallace nor Gardner supplies the deficiencies that are claimed and disclosed in the present invention.

Additionally, new claims 22 and 24 are dependent from one of the independent claims 2 and 5, and due to such dependency, are also distinguishable from Gardner, or, in the alternative, the proposed combination of Gardner and Wallace.

Applicants therefore respectfully request that the rejection of claims 2 and 5 under 35 U.S.C. 102(e), or, in the alternative, under 35 U.S.C. §103(a) be withdrawn.

Claims 3 and 4 are rejected under 35 U.S.C. § 102(e) as said to be anticipated by Ma et al., U.S. Patent No. 6,407,435 ("Ma"), or, in the alternative, under 35 U.S.C. §103(a) as said to be obvious over Ma in view of Wallace. (Office Action, at 5 to 6).

Claim 3 is rewritten in dependent form depending from claim 2 and claim 4 depends from claim 3. Ma and the proposed combination of Ma and Wallace were applied by the Examiner against independent claim 3 and dependant claim 4. Since this is no longer the case (i.e., claims 3 and 4 now depend from independent claim 2), it is respectively requested that the above 103 rejections of claims 3 and 4 be withdrawn.

Applicants therefore respectfully request that the rejection of claims 3 and 4 under 35 U.S.C. 102(e), or, in the alternative, under 35 U.S.C. §103(a) be withdrawn.

Claims 12 and 13 are rejected under 35 U.S.C. § 103(a) as said to be unpatentable over Wallace in view of Rodder, U.S. Patent No. 6,261,887 ("Rodder"). (Office Action, at 7 to 8).

Claims 12 and 13 are rewritten to include limitations similar to that of claim 1. And for reasons similar to those previously described *supra* with regard to claim 1, it is believed that amended independent claims 12 and 13 are distinguishable from Wallace.

Rodder was applied by the Examiner for the features of "first and second transistor regions (16 and 18; column 4, lines 19-30), wherein the gate insulating films have different compositions /dielectric constants (column 11, lines 30-60)." Rodder, however, does not disclose a gate insulating film at least part of which includes an insulating film containing metal, silicon and oxygen, wherein fluorine or fluorine and nitrogen are contained in said insulating film containing metal, silicon and oxygen. Therefore, it is believed that amended independent claims 12 and 13 are distinguishable from the proposed combination of Wallace and Rodder.

Additionally, new claim 25 is dependent from independent claim 13, and due to such dependency, is also distinguishable over the proposed combination of Rodder and Wallace.

Applicants therefore respectfully request that the rejection of claims 12 and 13 under 35 U.S.C. 103(a) be withdrawn.

Furthermore, new independent claim 23 recites:

"A semiconductor device comprising:
a semiconductor substrate; and
a gate insulating film provided on the semiconductor substrate, at least part of the gate insulating film including a metal oxide film;

wherein a single insulating film containing metal, silicon and oxygen is provided between the semiconductor substrate and the metal oxide film and at least one of fluorine and nitrogen is contained in the single insulating film containing metal, silicon and oxygen."

New independent claim 23 is distinguishable from any of the cited references, particularly the Gardner reference, because claim 23 claims and discloses a single insulating film containing metal, silicon and oxygen and at least one of fluorine and nitrogen is provided between the semiconductor substrate and the metal oxide film. In Gardner, the laminated film structure includes two metal oxide films 206, 208 and one silicon oxynitride film 204. (See Gardner, Column 4, line 17). Unlike the present invention which includes only a single insulating film. Therefore, Applicants believe new independent claim 23 is patentable over the cited prior art references.

In view of these amendments and remarks, Applicants respectfully submit that all of the claims (claims 1-5, 12, 13 and 21-25) now pending in the application are in condition for allowance.

If any issue remains as an impediment to allowance, an interview with the Examiner is respectfully requested, prior to issuance of any paper other than a Notice of Allowance; and, the Examiner is respectfully requested to contact the undersigned to arrange a mutually convenient time and manner for such an interview.

In view of the amendments and remarks herewith, the application is in condition for allowance. Favorable reconsideration of the application and prompt issuance of a Notice of Allowance, or an interview at a very early date with a view to placing the application in condition for allowance, are earnestly solicited.

Please charge any fees incurred by reason of this response and not paid herewith to Deposit Account No. 50-0320.

Respectfully submitted,

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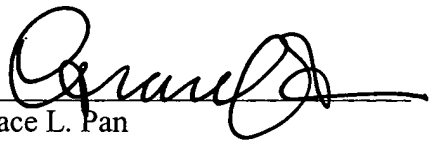
By: 

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